CLAIMS

1. Process for producing tyres for vehicle wheels, the said process comprising the following steps:

manufacturing a green tyre comprising at least one crosslinkable elastomeric material;

subjecting the green tyre to moulding in a mould cavity defined in a vulcanization mould;

crosslinking the elastomeric material by heating the tyre to a predetermined temperature and for a predetermined time;

characterized in that the crosslinkable elastomeric material comprises: (a) an elastomeric polymer containing carboxylic groups, and (b) an epoxidized liquid organic compound containing epoxide groups located internally on the molecule,

the said crosslinking step being carried out substantially in the absence of additional crosslinking agents.

2. Process according to Claim 1, wherein the crosslinking step is carried out by heating the crosslinkable elastomeric material to a temperature of at least 120°C for a time of at least 3 minutes.

3. Process according to Claim 2, wherein the crosslinking step is carried out by heating the crosslinkable elastomeric material to a temperature of at least 160°C for a time of at least 10 minutes.

4. Process according to any one of the preceding claims, wherein the elastomeric material also comprises a reinforcing filler.

5. Process according to claim 4, wherein the reinforcing filler is present in an amount of between 20 and 120 phr.

6. Process according to claim 5, wherein the reinforcing filler is present in an amount of between 40 and 90 phr.

7. Process according to any one of the preceding claims, wherein the epoxidized liquid organic compound has an epoxide equivalent weight of between 40 and 2,000.

8. Process according to claim 7, wherein the epoxidized liquid organic compound has an epoxide equivalent weight of between 50 and 1,500.

9. Process according to claim 8, wherein the epoxidized liquid organic compound has an epoxide equivalent weight of between 100 and 1,000.

10. Process according to any one of the preceding claims, wherein the epoxidized liquid organic compound comprises an epoxidized oil.

11. Process according to Claim 10, wherein the epoxidized oil has a freezing temperature lower than 23°C.

12. Process according to any one of the preceding claims, wherein the epoxidized liquid organic compound comprises an epoxidized diene oligomer.

13. Process according to Claim 12, wherein the epoxidized diene oligomer has an average molecular weight of between 500 and 10,000.

14. Process according to Claim 13, wherein the epoxidized diene oligomer has an average molecular weight of between 1,000 and 8,000.

15. Process according to Claims from 12 to 14, wherein the epoxidized diene oligomer is an epoxidized oligomer of 1,3-butadiene or isoprene, or mixtures thereof.

16. Process according to any one of the preceding claims, wherein the elastomeric polymer containing

carboxylic groups is a homopolymer or copolymer containing at least 0.1 mol% of carboxylic groups, relative to the total number of moles of monomers in the polymer.

17. Process according to claim 16, wherein the carboxylated elastomeric polymer contains from 1 to 30 mol%, of carboxylic groups.

18. Process according to claims 16 or 17, wherein the carboxylated elastomeric polymer has an average molecular weight of between 2,000 and 1,000,000.

19. Process according to claim 18, wherein the carboxylated elastomeric polymer has an average molecular weight of between 50,000 and 500,000.

20. Process according to any one of the preceding claims, wherein the carboxylated elastomeric polymer is obtained by (co)polymerization of one or more conjugated diene monomers, optionally in admixture with monovinylarenes and/or polar comonomers, and subsequent carboxylation.

21. Process according to any one of Claims 1 to 19, wherein the carboxylated elastomeric polymer is obtained by copolymerization between a conjugated diene, optionally in admixture with monovinylarenes and/or polar comonomers, and an olefinic monomer containing one or more carboxylic groups or derivatives thereof.

22. Process according to any one of Claims 1 to 19, wherein the carboxylated elastomeric polymer is obtained by copolymerization of one or more monoolefins with an olefinic comonomer containing one or more carboxylic groups or derivatives thereof.

23. Process according to any one of the preceding claims, wherein the epoxidized liquid compound is present in an amount of between 5 and 200 parts by weight per 100 parts by weight of elastomeric polymer.

24. Process according to claim 23, wherein the epoxidized liquid compound is present in an amount of between 10 and 120 parts by weight per 100 parts by weight of elastomeric polymer.

25. Process according to any one of the preceding claims, wherein the crosslinkable elastomeric material comprises an effective amount of a condensation catalyst.

26. Tyre for vehicle wheels, comprising one or more components made of crosslinked elastomeric material, characterized in that at least one of the said components comprises, as crosslinked elastomeric material, an elastomeric polymer containing carboxylic groups which is crosslinked by reaction with an epoxidized liquid organic compound containing epoxide groups located internally on the molecule, wherein the said carboxylated elastomeric polymer is crosslinked substantially in the absence of additional crosslinking agents.

27. Tyre according to Claim 26, wherein the said crosslinked elastomeric material also comprises a reinforcing filler.

28. Tyre according to Claim 27, wherein the reinforcing filler is present in an amount of between 20 and 120 phr

29. Tyre according to Claim 28, wherein the reinforcing filler is present in an amount of between 40 and 90 phr

30. Tyre according to any one of Claims 26 to 29, wherein the epoxidized liquid organic compound is defined according to any one of Claims 7 to 15.

31. Tyre according to any one of Claims 26 to 30, wherein the elastomeric polymer containing carboxylic groups is defined according to any one of Claims 16 to 22.

32. Tyre for vehicles, comprising a belt structure extended coaxially around a carcass structure and a tread band extended coaxially around the belt structure and having an external rolling surface which is intended to come into contact with the ground, characterized in that the said tread band comprises an elastomeric polymer containing carboxylic groups crosslinked by reaction with an epoxidized liquid organic compound containing epoxide groups located internally on the molecule, and wherein the said carboxylated elastomeric polymer is crosslinked substantially in the absence of additional crosslinking agents.

33. Tyre according to Claim 32, wherein the tread band also comprises a reinforcing filler.

34. Tyre according to Claim 33, wherein the reinforcing filler is present in an amount of between 20 and 120 phr

35. Tyre according to Claim 34, wherein the reinforcing filler is present in an amount of between 40 and 90 phr

36. Tyre according to any one of Claims 32 to 35, wherein the epoxidized liquid organic compound is defined according to any one of Claims 7 to 15.

37. Tyre according to any one of Claims 32 to 36, wherein the elastomeric polymer containing carboxylic groups is defined according to any one of Claims 16 to 22.

38. Crosslinkable elastomeric composition comprising: (a) an elastomeric polymer containing carboxylic groups; and (b) an epoxidized liquid organic compound containing epoxide groups located internally on the molecule; the said composition being crosslinkable substantially in the absence of additional crosslinking agents.

39. Crosslinkable elastomeric composition according to Claim 38, also comprising a reinforcing filler.

40. Composition according to Claim 39, wherein the reinforcing filler is present in an amount of between 20 and 120 phr.

41. Composition according to Claim 40, wherein the reinforcing filler is present in an amount of between 40 and 90 phr.

42. Composition according to Claim 38 to 41, wherein the epoxidized liquid organic compound has an epoxide equivalent weight of between 40 and 2,000.

43. Composition according to Claim 42, wherein the epoxidized liquid organic compound has an epoxide equivalent weight of between 50 and 1,500.

44. Composition according to Claim 43, wherein the epoxidized liquid organic compound has an epoxide equivalent weight of between 100 and 1,000.

45. Composition according to any one of Claims 38 to 44, wherein the epoxidized liquid organic compound comprises an epoxidized oil.

46. Composition according to Claim 45, wherein the epoxidized oil has a freezing temperature lower than 23°C.

47. Composition according to any one of Claims 38 to 46, wherein the epoxidized liquid organic compound comprises an epoxidized diene oligomer.

48. Composition according to Claim 47, wherein the epoxidized diene oligomer has an average molecular weight of between 500 and 10,000.

49. Composition according to Claim 48, wherein the epoxidized diene oligomer has an average molecular weight of between 1,000 and 8,000.

50. Composition according to Claims from 38 to 49, wherein the epoxidized diene oligomer is an

epoxidized oligomer of 1,3-butadiene or isoprene, or mixtures thereof.

51. Composition according to any one of Claims 38 to 50, wherein the elastomeric polymer containing carboxylic groups is a homopolymer or copolymer containing at least 0.1 mol% of carboxylic groups relative to the total number of moles of monomers present in the polymer.

52. Composition according to claim 51, wherein the carboxylated elastomeric polymer contains from 1 to 30 mol% of carboxylic groups.

53. Composition according to claims 51 or 52, wherein the carboxylated elastomeric polymer has an average molecular weight of between 2,000 and 1,000,000.

54. Composition according to claim 53, wherein the carboxylated elastomeric polymer has an average molecular weight of between 50,000 and 500,000.

55. Composition according to any one of Claims 38 to 54, wherein the carboxylated elastomeric polymer is obtained by (co)polymerization of one or more conjugated diene monomers, optionally in admixture with monovinylarenes and/or polar comonomers, and subsequent carboxylation.

56. Composition according to any one of Claims 38 to 54, wherein the carboxylated elastomeric polymer is obtained by copolymerization between a conjugated diene, optionally in admixture with monovinylarenes and/or polar comonomers, and an olefinic monomer containing one or more carboxylic groups, or a derivative thereof.

57. Composition according to any one of Claims 38 to 54, wherein the carboxylated elastomeric polymer is obtained by copolymerization of one or more monoolefins

with an olefinic comonomer containing one or more carboxylic groups or derivatives thereof.

58. Composition according to any one of Claims 38 to 57, wherein the epoxidized liquid compound is present in an amount of between 5 and 200 parts by weight per 100 parts by weight of elastomeric polymer.

59. Composition according to Claim 58, wherein the epoxidized liquid compound is present in an amount of between between 10 and 120 parts by weight per 100 parts by weight of elastomeric polymer

60. Composition according to any one of Claims 38 to 59, also comprising an effective amount of a condensation catalyst.

61. Crosslinked elastomeric product obtained by crosslinking a composition according to any one of Claims 38 to 60.